

Amendment  
Application No. 10/767,167  
Attorney Docket No. 042054

**AMENDMENTS TO THE CLAIMS**

**Listing of claims:**

This listing of claims replaces all prior versions and listings of claims in the application.

1. (Currently Amended) An integrated circuit comprising a fine vacuum tube element and other electronic elements integrated and formed on a substrate of a semiconductor ~~or the like~~, the fine vacuum tube element and the other electronic elements transmitting signals to and from each other.
  
2. (Original) The integrated circuit as claimed in claim 1, wherein when integrating the vacuum tube element with the other electronic elements, a quantum effect is realized in a room temperature environment by utilizing ballistic electrons (non-scattering electrons) traveling through the vacuum.
  
3. (Currently Amended) The integrated circuit as claimed in claim 1 or 2, wherein an interference system ~~such as a Mach Zehnder interferometer~~ is constructed and an A/D converter is constructed.
  
4. (Currently Amended) The integrated circuit as claimed in claim 1 or 2, wherein an interference system ~~such as a Mach Zehnder interferometer~~ is constructed and weighting of the

Amendment

Application No. 10/767,167

Attorney Docket No. 042054

~~Mach-Zehnder interferometer~~ interference system is constituted for image processing and signal code conversion to realize an advanced function-integrated type.

5. (Original) The integrated circuit as claimed in claim 1 or 2, wherein a very high-speed light-receiving integrated circuit for optical communication is constructed by utilizing a very high-speed optical response characteristic of electron emission of the vacuum element.

6. (Original) The integrated circuit as claimed in claim 1 or 2, wherein a sensor such as a magnetic/electric field sensor is constructed by utilizing a quantum effect of ballistically traveling electrons.

7. (Original) The integrated circuit as claimed in one of claims 1 to 6, wherein a thermionic cathode is used as a cathode of the vacuum element.

8. (Original) The integrated circuit as claimed in claim 7, wherein LaB<sub>6</sub> (lanthanum hexaboride) or carbon nanotube is attached to the thermionic cathode.

9. (New) The integrated circuit according to claim 3, wherein the interference system is a Mach-Zehnder interferometer.

**Amendment**

**Application No. 10/767,167**

**Attorney Docket No. 042054**

10. (New) The integrated circuit according to claim 4, wherein the interference system is a Mach-Zehnder interferometer.
  
11. (New) The integrated circuit device according to claim 1, wherein the other electronic elements are solid state devices.